

### **REMARKS**

Claims 1, 3-10, 12, 13, 16, 17, 19-30 and 32-35 are pending in the application. By this Amendment, Claims 1, 3, 10, 12, 16, 17 and 32-34 are amended, and Claims 2, 11, 15 and 36 are canceled without prejudice or disclaimer of the subject matter contained therein. Favorable reconsideration is respectfully requested in light of the following Remarks.

Applicant gratefully acknowledges that the Office action indicates that Claims 15, 16 and 36 would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. For the reasons set forth below, it is respectfully submitted that the application is in condition for allowance.

#### **I. Miscellaneous**

The Office action objects to Claims 4, 7, 21-26, 29 and 30 as being of improper dependent form for failing to further limit the subject matter of a previous claim. The objection is respectfully traversed.

The Examiner is reminded that the test as to whether a claim is a proper dependent claim is that it shall include every limitation of the claim from which it depends *See 35 USC 112, fourth paragraph*. In other words, the dependent claim shall not be conceivably be infringed by anything which would not also infringe the basic claim. *See MPEP 608.01(n)*. For example, if claim 1 recited the combination of elements A, B, C, and D, a claim reciting the structure of claim 1 in which D was omitted or replaced by E would not be a proper dependent claim, even though it placed further limitations on the remaining elements or added still other elements.

In addition, the fact that the independent and dependent claims are in different statutory classes does not, in itself, render the latter improper. Thus, if claim 1 recites a specific product, a claim for the method of making the product of claim 1 in a particular manner would be a proper dependent claim since it could not be infringed without infringing claim 1. Similarly, if claim 1 recites a method of making a product, a claim

for a product made by the method of claim 1 could be a proper dependent claim. *See MPEP 608.01(n)*.

The Examiner is also reminded that a dependent claim is directed to a combination including everything recited in the base claim and what is recited in the dependent claim. It is the combination that must be compared with the prior art, exactly as if it were presented as one independent claim.

In view of the foregoing, it is respectfully submitted that Claims 4, 7, 21-26, 29 and 30 include every limitation of the claims from which they depend, and are therefore proper dependent claims. Withdrawal of the objection is respectfully requested.

## II. The Claims Define Patentable Subject Matter

1. The Office action rejects Claim 34 under 35 U.S.C. 102(b) over Shimizu et al. (U.S. Patent No. 5,224,534, hereinafter "Shimizu"). The rejection is respectfully traversed.

The Examiner asserts that Shimizu teaches "a cold hearth vessel (2) which 'could' hold a pool of liquid metal and a slag layer...". *See Page 2*. (Emphasis Added). However, Shimizu is not directed to an electrosag hearth system, but to an e-beam system. Thus, Shimizu does not disclose, teach or suggest a liquid slag layer overlying the cold hearth vessel because the e-beam process does not involve using a slag.

In addition, because Shimizu does not involve using a slag, there is no mention in Shimizu of at least the feature of a power supply for electrically heating the liquid slag layer.

However, to expedite prosecution, independent Claim 34 is amended to substantially incorporate the feature of a consumable electrode formed of titanium or titanium alloy, as recited in Claim 36, indicated as containing patentable subject matter.

For at least reason, Claim 34 is allowable over the applied art. Withdrawal of the rejection is respectfully requested.

2. The Office action rejects Claims 1, 4-13, 17 and 19-32 under 35 U.S.C. 102(e) over Jackson et al. (U.S. Patent No. 6,712,875, hereinafter "Jackson"). The

rejection is respectfully traversed.

Similar to Shimuzu, Jackson is not directed to an electros slag hearth system, but to a plasma torch system. Thus, Jackson does not disclose, teach or suggest a liquid slag layer overlying the cold hearth vessel because the plasma torch process does not involve using a slag. In addition, there is no mention in Jackson of at least the feature of a power supply for electrically heating the liquid slag layer.

However, to expedite prosecution, independent Claim 1 is amended to substantially incorporate the features of a source of metal comprising a consumable electrode and a non-consumable electrode in contact with the liquid slag layer, wherein a portion of the non-consumable electrode surrounds a portion of the consumable electrode, as recited in dependent Claim 15, indicated as containing patentable subject matter.

For at least reason, Claim 1 is allowable over the applied art. Claims 4-13, 17 and 19-30, which depend from Claim 1, are likewise allowable over the applied art. Withdrawal of the rejection is respectfully requested.

By this Amendment, independent Claim 32 substantially incorporates the feature of a non-consumable electrode in contact with the slag layer, wherein the non-consumable electrode comprises a portion of the cold hearth vessel and the ingot mold, and wherein the non-consumable electrode is electrically separated from the cold hearth vessel and the ingot mold by an insulator, as recited in dependent Claim 16, indicated as containing allowable subject matter.

For at least reason, Claim 32 is allowable over the applied art. Withdrawal of the rejection is respectfully requested.

3. The Office action rejects Claims 2, 3, and 33-35 under 35 U.S.C. 103(a) over Jackson in view of Shimizu. The rejection is respectfully traversed.

Claims 2 and 3 depend from Claim 1. As mentioned above, independent Claim 1 is amended to substantially include the feature of dependent Claim 15, indicated as containing allowable subject matter.

For at least this reason, Claims 2, 3 are allowable over the applied art, taken singly or in combination. Withdrawal of the rejection is respectfully requested.

Claim 35 depends from Claim 34. As mentioned above, independent Claim 34 is amended to substantially include the feature of dependent Claim 36, indicated as containing allowable subject matter.

For at least this reason, Claim 35 is allowable over the applied art, taken singly or in combination. Withdrawal of the rejection is respectfully requested.

### III. Conclusion

In view of the foregoing, it is respectfully submitted that the application is in condition for allowance. Favorable consideration and prompt allowance of the application is earnestly solicited.

Should Examiner Kastler believe anything further would be desirable in order to place the application in better condition for allowance, the Examiner is invited to contact the undersigned attorney at the telephone number listed below.

It is believed that any additional fees due with respect to this paper have already been identified. However, if any additional fees are required in connection with the filing of this paper, permission is given to charge account number 07-0868 in the name of General Electric Company.

Respectfully submitted,

18 December 2007

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